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WILL PHARMACISTS ACCEPT?

By Joseph P. Remington.

The attention of the writer having been directed to the following letter by Dr. E. Cutter, N. Y., in the *Journal of the American Medical Association*, December 17, 1887, by Mr. J. M. Colcord, of Lynn, it would appear to call for the earnest consideration from pharmacists that the importance of the subject demands:

WHY NOT THE PHARMACISTS?

Dear Sir:—The late innovation of having a Section of Dentistry at the Ninth International Medical Congress working so well, and the great excellence of the pharmaceutical display, invite the question, Why not have a Section of Pharmacy in the American Medical Association?

It is simply raised for discussion, adding the following memoranda:

1. Pharmacy is a branch of medicine.

2. In many parts of our country the physician is his own pharmacist, and every man would be his own pharmacist if it could be done consistently with his work.

3. Therapeutical pharmacy is equally as honorable, important, and valuable as any other branch of medicine.

4. Pharmacy has of late instructed the medical profession by therapeutical and medical journals, monographs and publications, forming a literature that medical men must get acquainted with or be left behind; the literature of cocaine for example.

5. Such a Section should be composed of, managed, and under the control of such bodies as the American Pharmaceutical Association, and be an autonomic department regulated by itself, as the Dental Section is.

6. The objection arising from the existence of disreputable and incompetent pharmacists, applies with equal force to physicians, but has not prevented the organization of the American Medical Association.

7. Such a Section would confer a social equality and standing on the pharmacists that would be healthy.

8. It would throw them into professional contact with physicians pleasantly,

and conferences could be had as to desirable points to be made, and the result would tend to prevent each from trenching on the other's domains.

9. In the battle with disease, physicians, surgeons, dentists, specialists, pharmacists, and veterinarians, ought to move harmoniously forward against the enemy that means *war;* and *war* means *kill* or *be killed.* Nothing is gained by derision and decrying opposition of one division against the other, which often result in defeat. On the contrary, there is everything to be found by the mutual confidence, respect, and trust which such a Section would inspire and foster.

10. The overture should come from the American Medical Association.

E. CUTTER, M. D.

New York, November, 1887.

There can be no question about the desirability of making a strong effort to bring together the best elements of the professions of medicine and pharmacy, and it is very doubtful if a more opportune time than the present can be secured for the inauguration of a concerted movement looking to this end.

Dr. Cutter has outlined briefly, but clearly, many of the advantages that would be derived from the establishment of a Section on Pharmacy in the American Medical Association, and if an invitation were extended to the American Pharmaceutical Association, it would doubtless find favor, and be accepted.

One very important reason for a medium for interchange of ideas has not been alluded to by Dr. Cutter, and this is, the necessity for extended joint conference by physicians and pharmacists upon the approaching revision of the United States Pharmacopœia. Much of the unfavorable criticism upon the last edition of this standard would have been avoided, if the members of both professions represented in the national organizations of each, had previously convened and presented a joint report to the Washington convention embodying their views. The pharmacopœia of a country having the magnitude of ours, coupled with such diversity in population and climate, as we have here, materia medica must contain remedies which are representative, and which satisfy the needs of all sections, and whilst the actual work of compiling the Pharmacopœia is best performed by a committee specially appointed by a convention called solely to consider the work, there is no doubt that the views of the American Medical Association (if they had been offered at the last convention, for revising the Pharmacopœia) would have received the same consideration that those of the American Pharmaceutical Association did; and this practically amounted to the almost complete adoption of their report.

In the reorganization of the American Pharmaceutical Association at the Cincinnati meeting, in September, 1887, one of the most important changes introduced was the classification of the various subjects which annually come before the meeting, under appropriate heads, and providing for their discussion by referring them to Sections especially organized for their consideration.

If the invitation now proposed by Dr. Cutter should be tendered to the Pharmaceutical Association there will be presented an excellent opportunity for reciprocity, through the establishment of a Section devoted to the interests of medicine, and as the conventions of the National Associations occur usually four or five months apart, the meetings of the Section on "Pharmacy in its relations to Medicine" in the American Medical, and that of the Section on "Medicine in its relations to Pharmacy" in the American Pharmaceutical Association would doubtless have a good influence in fostering harmony, and creating that mutual confidence and trust which is now so earnestly desired in combating the evils which harass both professions. *Cannot all little differences be swept aside,* the ice be broken, and an honorable bond of union be established?

AN EASY METHOD OF FINDING THE SPECIFIC GRAVITY OF LIQUIDS.

By Alfred B. Taylor, Ph. M.

A new application of an old rule has suggested a method of finding the specific gravity of liquids, which I have never seen mentioned, and which from its simplicity and great ease of application seems worthy of publication. By means of it the specific gravity of any liquid can be ascertained without calculation, or any apparatus other than a good balance and accurate weights.

It is known that the weight of a body is to its specific gravity, as its loss of weight when immersed in a liquid, is to the specific gravity of that liquid; for example:—200 grains of citric acid (sp. gr. 1·60) lose in weight 115 grains when weighed in oil; and as 200 is to 1·60, so is 115 to .920 the sp. gr. of the oil. Now if we make the weight of the citric acid the same number of grains as its specific gravity our formula becomes—as 1·60 is to 1·60, so is the loss in weight of the citric acid when weighed in oil to the specific gravity of the oil; or,

in other words, the loss of weight is equal to the specific gravity; from which we deduce the following general rule:—

The specific gravity of a liquid is equal to the loss of weight (in grains) sustained by a solid body when immersed in the liquid, the weight of the solid being equal (in grains) to its specific gravity.

Hence it is necessary only to weigh the solid in the liquid, and its loss gives at once the specific gravity of the liquid.

Taking the preceding example:—if 200 grains of citric acid lose 115 grains, 1·6 grain will lose .920 grain, and this loss is equal to the specific gravity of the oil.

In practice the weight of the solid might be 10 or 100 times the weight of its specific gravity, care being taken to put the decimal point in the right place in the final result.

As perhaps one of the most desirable solid bodies to use, I would suggest a piece of aluminium weighing 256 grains; the specific gravity of that metal being 2·56. If upon trial its specific gravity should vary from these figures, its weight should be made to correspond.

For liquids having greater specific gravity than 2·56, it would be necessary to use a heavier solid than aluminium.

EMULSION OF TEREBENE.

By Joseph W. England, Ph.G.

Read at the Pharmaceutical Meeting, January 17.

In the internal administration of oleaginous and non-oleaginous volatile liquids, the tendency of the times seems strongly tending towards the universal adoption of the emulsion, as the most satisfactory form of preparation, and, when it is remembered, especially as regards the fixed and volatile oils, that the more finely divided in physical condition, with which they are presented to the digestive apparatus, the less liability there is to cause nausea and eructation, and the more readily do they undergo digestion and absorption (or conversely) the naturalness of using an emulsion is readily explained.

As a rule the fixed oils yield most readily to emulsionizing influences, so that their suspension presents no especial difficulties, but in the case of volatile oils and liquids we find a different state of affairs. Whilst a few of these readily give good emulsions, this result is by no means a universal one, and is secured only after using relatively

large quantities of powdered acacia, with the loss of a varying per cent. of the volatile liquid emulsified, incident to the long trituration necessary to suspend it. Even when finished they are prone to separate. We find this especially the case with such liquids as ether, chloroform, terebene, etc.

Numerous expedients have been suggested, but each in turn, have failed to come up to the sanguine hopes of their proposers. Taking advantage of the great emulsionizing properties of milk, the writer has advocated, for some time, the giving of these and similar liquids in that natural emulsion, with each dose, and the results obtained have been most satisfactory. The advantages are readily apparent; first, in the accuracy of the dose since none of the liquid can be lost by volatilization as in the preparation of emulsions, and, second, in its acceptability to the patient.

As a remedy in the treatment of certain throat affections, terebene has, in the last few years, attained considerable prominence in medical circles, but its employment has been restricted on account of the impossibility of obtaining an emulsion with it, and recourse was then had to the simpler method of giving in capsules or dropping on sugar and dissolving in the mouth, and this is the mode of administration in general use at present.

This expedient, however, is a very unsatisfactory one, and the writer here gives a new process for the emulsion, based upon the fact that terebene is readily emulsionized, if previously mixed with an equal volume of cotton-seed oil. The formula used is as follows:

Take of

Terebene		
Ol. gossyp. sem	aa	ℿ. clx.
Pulv. acaciæ		ʒ vj.
Pulv. sacchari		ʒ ij.
Aquæ q. s. fiat		fʒ iv.

Mix.

Dose: 1 to 2 teaspoonfuls (=10-20 drops).

The product is a milk-white, perfectly suspended liquid, having the odor, and bitter, turpentine-like taste of terebene, and is miscible with water, without separation.

This method, of previously admixing with cotton-seed oil, is very useful in suspending volatile oils, especially the oils of gaultheria and eucalyptus, which have come into such general use within the past year, and it is more economical, in that a much less quantity of acacia

is necessary for suspension, but it is of no value whatever in the emulsification of such liquids as ether and chloroform, so that we are compelled to fall back, in their administration, upon previous admixture with milk, as each dose is given; a temporary expedient only, possibly, but one which has certainly yielded good results.

SYRUPUS LACTUCARII.

By Geo. M. Beringer, Ph.G.

Read at the Pharmaceutical Meeting, January 17.

The formula for syrup of lactucarium of the Pharmacopœia of 1870 yielded a preparation which, to say the least, was not desirable; being unsightly, turbid and not answering the requirements of modern elegant pharmacy. The *modus operandi*, briefly stated, consisted in treating one troy-ounce of lactucarium properly comminuted with diluted alcohol until a half pint of tincture was obtained. This tincture, evaporated at a temperature not exceeding 160°F. to 2 fluid-ounces, was mixed with 14 fluid-ounces of warm syrup.

That the turpidity and unsightliness of this preparation was due to the lactucerin or lactucone—the caoutchouc-like matter—was early recognized. In 1868, Mr. James Kenworthy recommended that the tincture be triturated with powdered pumice-stone and water, and filtered, and then decolorized by treating with animal charcoal before adding the sugar.

The same year, Mr. R. F. Fairthorne recommended that the tincture prepared as in the process of the Pharmacopœia of 1870, be treated with ether to dissolve out the lactucerin, the ethereal solution separated and the tincture then mixed with sugar and water.

In 1878, Mr. Lemberger proposed treating the lactucarium with benzin previous to its extraction with diluted alcohol, and submitted the following formula for the fluid extract to the Committee on Revision of the Pharmacopœia:*

Take of

Lactucarium	16 parts.
Benzin	32 "
Diluted alcohol, a sufficient quantity	

Beat the lactucarium thoroughly in an iron mortar, then introduce

* Proceedings American Pharmaceutical Association, 1878.

it into a wide-mouth bottle of the capacity of about 48 parts of water, add the benzin, cork tightly, and macerate, with frequent agitation, for twenty-four hours. Then let it stand for about twenty-four hours, or until the lactucarium subsides and the benzin solution becomes clear or nearly so. Decant the benzin solution, transfer the lactucarium to a stone or glass slab, spread it as thin as possible, and allow it to remain there until it is completely dry (at least twenty-four hours). Then rub it in an iron mortar with an equal weight of clean sand, introduce it into a conical percolator, first prepared with a disk of flannel and a thin layer of sand, pack tightly and add diluted alcohol to a depth of several inches. When the liquid begins to drop, close the orifice of the percolator with a cork and allow it to stand at rest, well covered, for twenty-four hours. Now remove the cork and collect 4 parts of percolate, which set aside. Continue the percolation until the lactucarium is exhausted, recover the alcohol from the percolate by distillation from a water-bath, and evaporate the residue on a water-bath to 10 parts. Mix this with the reserved portion, filter and wash the filter with enough diluted alcohol to make the whole product weigh 16 parts.

In this process the lactucerin is not entirely removed. That portion of the benzin remaining in the lactucarium after decanting, which is considerable, remains saturated with lactucerin, sufficient to leave the lactucarium, on drying, of a gummy tendency and difficult to pulverize and sufficient to be extracted by the subsequent treatment with diluted alcohol, and to render the syrup made therefrom decidedly turbid.

If, however, the lactucarium after decanting the clear layer of benzin is thrown on a double paper filter and then washed with about half the quantity of benzin first used, this dissolved portion will be forced out and the lactucarium remaining will dry and be easily pulverized and extracted.

The Pharmacopœia of 1880 instituted a new departure, adopting a formula for a fluid extract. The aim of this formula, as of all recent formulæ and investigations, was to furnish a preparation from which a perfectly clear and acceptable syrup could be made by simple admixture. The officinal formula devised by Prof. C. L. Diehl is remarkable for its complexity. No attempt is made to remove the lactucerin; the treatment with ether merely aiming to disintegrate and separate it from the other ingredients, and leave it in such a

condition that comparatively little will be dissolved by the subsequent macerations with weak alcohol, and this is largely deposited on evaporating the strained solutions and allowing to stand for a time.

While the product of the present officinal formula is a decided improvement on that of the previous Pharmacopœia, it is not entirely satisfactory, the method being expensive and difficult. As the use is rather limited, but few retail druggists will attempt to prepare it, depending on the manufacturing pharmacist for their supply of the fluid extract. As the officinal formula is not satisfactory in manipulation or in product, it is not generally followed by these manufacturers. It becomes the duty of the revisers of our national standard to adopt such a formula as will be practical for the retailer or the manufacturer. I am of the opinion that a radical mistake of all the proposed formulæ for fluid extract of lactucarium is the attempt to make a fluid extract of the strength of 100 gm. to the 100 c.c. In fact, all fluid extracts would be rendered more permanent and uniform in medicinal effects if a strength of one-half troy-ounce to the fluid-ounce, or of 50 gms. to the 100 c.c. had been adopted. This is especially the case with a drug like lactucarium, yielding to diluted alcohol nearly fifty per cent. of its weight. In confirmation of this point, I would say that several of the principal manufacturers are making this fluid extract of only one-half the officinal strength.

I have been preparing syrup of lactucarium from a fluid extract, or, I should rather say, a concentrated tincture of lactucarium of one-half the officinal strength. The formula which is based on that of Mr. Lemberger is as follows:

Take of

Lactucarium..... 100 gms.

Beat it up in an iron mortar with an equal weight of clean sand (I prefer small pieces of pumice-stone) to a coarse powder and place it in a large bottle with

Benzin..... 400 c.c.

Tightly cork the bottle and allow to macerate for 2 or 3 days with repeated agitation. Decant the lactucarium in a double paper-filter and allow it to drain. Wash the dregs with about 100 or 150 c.c. of benzin and allow the lactucarium to dry by opening out the filter on a slab or a few sheets of porous paper. When dry rub it up in an iron mortar, using a little more sand or pumice, if necessary, and pack

lightly in a conical percolator. Cover with a layer of several inches with a menstruum of

Glycerin	25 c.c.
Water	75 c.c.
Alcohol	100 c.c.

Tightly cork the lower orifice of the percolator and allow to macerate for 24 hours. Then continue the percolation reserving the first 125 c.c. of percolate. Continue the percolation, using diluted alcohol, until the lactucarium is extracted. Evaporate this tincture in the water-bath at a moderate temperature (about 160° F.) to 75 c.c. and mix with the reserved portion. Filter and add enough diluted alcohol through the filter to make the finished product measure 200 c.c.

To prepare the syrup,

Take of

Concentrated tincture of lactucarium	10 gms.
Syrup	90 gms.

Mix.

The samples of syrup and of the concentrated tincture submitted were prepared in May 1887, since which time they have remained in the same vials and have not been filtered. I submit another sample of syrup made at the same time, as follows:

Concentrated tincture of lactucarium	10 gms.
Glycerin	10 gms.
Syrup	80 gms.

Mix.

FLUID EXTRACT OF CAULOPHYLLUM.

Contribution from the Pharmaceutical Laboratory, Philadelphia College of Pharmacy.

By J. H. Bunting.

Read at the Pharmaceutical Meeting, January 17.

Different menstrua were used on four portions of caulophyllum, each of 8½ ounces avoirdupois, in No. 60 powder, and the resulting products were numbered one, two, three and four respectively.

Dilute alcohol was used in No. 1. After moistening the drug it was firmly packed in a cylindrical percolator and sufficient menstruum was added to saturate the powder and leave a stratum above. When the liquid began to drop, the lower orifice was closed, the percolator

covered and the contents macerated for 48 hours. At the expiration of this time, the percolation was allowed to proceed until the drug was exhausted. The first 6⅔ fluidounces of the percolate were reserved, and the remainder evaporated to a soft extract and dissolved in the reserve portion, adding sufficient diluted alcohol to make the finished product measure 8 fluidounces. This menstruum was not a good one. The extract was not clear and a heavy deposit took place.

In No. 2 a menstruum of 2 parts alcohol and 1 part of water was used. The manipulations with this and the subsequent ones were as in the preceding one. A better product was obtained by the use of alcohol and water in this proportion. It was not, however, a satisfactory product, as there was a considerable deposit on allowing it to stand.

No. 3, in which 3 parts alcohol and 1 part water were used as a menstruum, proved to be the best of the lot. A very good fluid extract was obtained which remains clear with only a slight deposit after allowing it to stand undisturbed more than two months.

In No. 4 the same menstruum, *i. e.*, diluted alcohol, as in No. 1, was used, except that 10 per cent. of glycerin was added to the first 8 fluidounces of menstruum used. A very unsatisfactory product resulted from the use of the glycerin; the deposit being greater than in No. 1.

FLUID EXTRACT OF YERBA SANTA (ERIODICTYON GLUTINOSUM).

Contribution from the Pharmaceutical Laboratory, Philadelphia College of Pharmacy.

By F. B. Quackenbush.

Read at the Pharmaceutical Meeting, January 17.

A formula for the above extract having been desired, the following experiments were undertaken with the view of determining the best menstruum to secure permanency in the fluid extract, and thorough exhaustion of the drug. The herb of Eriodictyon glutinosum, or as it is sometimes called, Eriodictyon californicum, was used in these experiments. It is non-officinal, and no formula is given in the dispensatories for its preparation, and as one of the objects was to find the

best menstruum for the drug it was concluded, after considering its character, to use in one case a menstruum of 3 parts alcohol and 1 part water, and in the other case one consisting of 2 parts alcohol and 1 of water.

The first formula is as follows:

Yerba santa in No. 60 powder	225 gm.
Alcohol	168 gm.
Water	57 gm.

To make 225 c.c. of the finished product.

The drug after being thoroughly moistened with 1½ fluidounces of the menstruum, was firmly packed in a cylindrical percolator, fitted at the neck with a cork of such size that when placed tightly in position it was about half way down the neck of the percolator. A glass tube was passed through the centre of the cork so that the upper end of the glass was flush with the upper surface of the cork, and of sufficient length to protrude a short distance below the neck of the percolator. A short piece of rubber tubing was placed upon the lower end, leaving about two inches of the tubing below the glass, on which was placed a pinchcock to regulate the flow. A small piece of cotton, previously moistened with the menstruum, was placed in the neck of the percolator, and pressed firmly down upon the surface of the cork. After packing the powder in the percolator a small disc of filtering paper was placed upon the drug, and the menstruum gradually added, always keeping a stratum above the surface of the drug, until the liquid began to drop from the percolator. The pinchcock was then closed, the top of the percolator tightly covered with a piece of waxed paper and maceration was continued for forty-eight hours. The liquid was subsequently allowed to drop slowly from the percolator, and the balance of the menstruum gradually added. The first 200 c.c. was set aside as the reserve portion, and the balance collected in another bottle; 225 c.c. of the menstruum were not sufficient to exhaust the drug, hence 140 c.c. more menstruum were added. The menstruum which had been absorbed by the drug was forced through by pouring 20 fluidounces of water into the percolator. The weak percolate was distilled to recover the alcohol, and the residue evaporated to a soft extract by means of a water-bath. The extract was dissolved in the reserve portion, and sufficient menstruum was added to make the required 225 c.c. of the finished product.

In the second formula a menstruum of 2 parts alcohol and 1 of water was used as follows:

Yerba santa in No. 60 powder	225 gm.
Alcohol	150 "
Water	75 "

To make 225 cc. of the finished product.

The details of the manufacture of this extract are identical with those of the first formula, except that 150 c.c. more menstruum were added to exhaust the drug instead of 140 c.c., as in the former case.

A comparison of the two processes would seem to indicate a preference for the first formula.

The residue of the first formula was found to be odorless, tasteless, and almost colorless, whilst that of the second formula still retained a slight odor and taste of the drug, which would indicate that it was not entirely exhausted, hence the extract could not contain as much of the active principle of the drug as that made by the first formula, both processes being conducted with the same care and attention.

The fluid extract made by the first formula had a peculiar odor, a dark olive-green color, and possessed an astringent and strongly bitter taste, whilst that obtained by the second formula had about the same odor, but it was much lighter in color, and lacked a deal of the astringency and bitterness which was found in the former.

The investigations seem to show clearly that a menstruum of 3 parts alcohol and 1 part water is much better for completely exhausting the active principles of the drug.

The alcohol which was recovered in the process of distillation had a strong odor of the drug, and, in order to purify it, 5 grs. of permanganate of potassium were added, and the whole allowed to stand for forty-eight hours, after which it was re-distilled. This distillate was converted into diluted alcohol by adding the required quantity of water. By this process a product was obtained which had but a faint odor of the drug, and the liquid could be used for many purposes.

Pereirine hydrochlorate as a substitute for quinine in cases of malarial fever is highly recommended by Ferreira, of Brazil (*Bull. gén. de thérap.; Med. Chronicle*). To a child, who could not take quinine, had been given two doses of fifteen grains of the pereirine salt, half an hour apart, and after a repetition of like doses, the next day, rapid recovery took place, with no further attacks.

ANALYSIS OF THE LEAVES OF EUPATORIUM PERFOLIATUM.

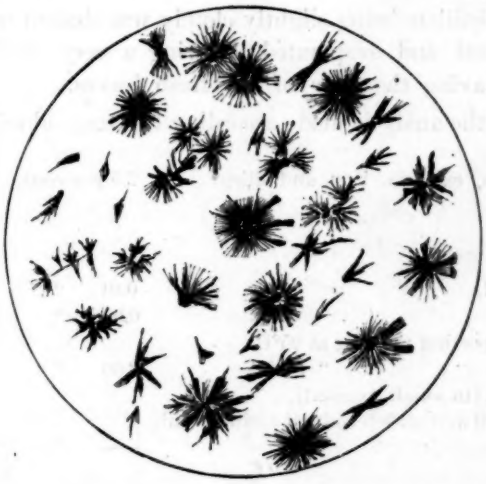
Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

By F. W. Franz.

Read at the Pharmaceutical Meeting, January 17.

The leaves of this plant, as far as I have been able to find out, have never been analyzed before, although the herb has frequently been.

A bitter principle was first isolated, by G. Latin, in 1880, from the ethereal extract of the herb by means of chloroform, and was named eupatorin. This principle was found, during my own investigation, in the petroleum spirit extract and was separated by repeatedly digesting in water. The coloring matter was removed by digesting the solution in absolute alcohol with animal charcoal and when evaporated



over sulphuric acid needles were obtained, very bitter and nauseous.

An aqueous solution of the principle gave the following reactions:

Fehling's solution was reduced when boiled for some time, due probably to impurities.

When heated with dilute hydrochloric acid a distinct raspberry-like odor was produced, and the liquid soon became cloudy; this was filtered, made slightly alkaline and Fehling's solution added which was soon reduced, thus showing it to be a glucoside soluble in water, alcohol, chloroform and ether.

Wax.—This was obtained by treating the residue, after the separation of the eupatorin, with stronger ether, whereby a white substance was separated and crystallized from petroleum spirit, in white, tasteless, acicular crystals.

Absolute alcohol dissolved a portion of these which on evaporation became yellow, insoluble in 95 per cent. alcohol and melting at 95°C.

The insoluble portion was recrystallized from petroleum spirit in white tasteless crystals, as shown by the drawing, but which on warming became yellowish, melting at 145°C., not affected by sulphuric acid or aqueous and alcoholic solution of potash, but soluble in glacial acetic acid, reprecipitated on the addition of water.

Mr. Latin also obtained a crystalline principle from the ethereal extract of the herb, by means of benzin, but speaks of it as having a low fusing point.

Volatile Oil.—About 2lbs of the fresh leaves were distilled with water; the distillate being slightly cloudy was shaken with petroleum spirit, separated and evaporated, showing a very small amount of volatile oil having the odor of the fresh leaves.

Summary of the analysis made according to Dragendorff's scheme:

Ash (potassium, calcium, iron, and silica)	7.5 per cent.		
Moisture			9.40 per cent.
Petroleum spirit extract:			
Volatile oil,	0.01	"	
Resin,	0.80	"	
Wax, { a portion melting at 95°C. " " " 145°C.	2.60	"	
Eupatorin, (in small amount),			
Chlorophyll and undetermined resinous substances,	——		6.19 "
Ethereal extract:			
Gallic acid,	1.50	"	
Resin and some chlorophyll,	6.80	"	
	——		8.30 "
Alcoholic extract:			
Tannic acid,	5.60	"	
Undetermined substances,	3.12	"	8.72 "
	——		
Aqueous extract:			
Mucilage and sugar,			20.86 "

Dilute soda extract:

Albuminoids and mucilage,	8.00 per cent.
Lignin,	3.82 "
Intercellular substances,	21.86 "
Cellulose,	9.31 "
Ash, (silica)	0.59 "
Loss,	2.95 "
	100.00

THE BITTER PRINCIPLE OF BURDOCK FRUIT.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

By Henry Trimble.

In the American Journal of Pharmacy for 1885, page 127, is an account of the proximate analysis of burdock fruit, by Mr. J. D. MacFarland and myself, in which it was stated that the bitter principle, then believed to be an alkaloid, would be further investigated. Since then as time has permitted I have reviewed the work until an entire re-analysis has been completed. The results differ in no important particular from those recorded then, except in the character of the bitter principle.

The absolute alcohol extract has been found now as then, to consist of a little resinous substance, somewhat soluble in water, and completely soluble in dilute alcohol. A large quantity of the desired material was prepared by exhausting the drug with petroleum spirit to remove fixed oil, and then with alcohol. On pouring the concentrated alcoholic solution into water the resin separated, but the bitter principle dissolved in the water, from which it was readily removed by agitation with chloroform. The residue on evaporating the chloroform was treated with water, and the clear aqueous solution allowed to evaporate in a desiccator over sulphuric acid, when a white granular crystalline substance separated. This may be further purified by resolution in water and again evaporating in a desiccator. The purified material is pure white, of an intensely bitter taste, and has a neutral reaction. On testing for alkaloids, negative results are gotten. Fehling's solution is not reduced, but on first boiling with very dilute hydrochloric acid for fifteen minutes the solution becomes cloudy, and finally a resin separates which appears to be identical with the resin obtained on pouring the alcoholic solution into water; now when the clear filtrate

from this resin is tested with Fehling's solution for glucose, decided evidence of it is obtained.

It is evident that the bitter principle is a glucoside, which, on boiling with dilute acid, decomposes into the resin, which is soluble in alcohol and sugar. Having more definitely determined the character of the bitter principle and exhibited a distinct quantity of it in crystalline form, I hope soon to investigate its composition and properties more fully.

MERCURAMMONIUM CHLORIDES.

Contribution from the Chemical Laboratory, Philadelphia College of Pharmacy.

By Frank X. Moerk, Ph.G.

Read at the Pharmaceutical Meeting, January 17.

In pharmaceutical and chemical text-books mention is made of three compounds derivable from the formula of ammonium chloride, by the introduction of dyad mercury in place of hydrogen.

Mercurammonium chloride NH_2HgCl, the officinal Ammoniated Mercury, or commonly known as "infusible white precipitate," is a compound in which an atom of dyad mercury replaces two hydrogen atoms in one molecule of ammonium chloride, NH_4Cl. This is gotten by the addition of mercuric-chloride solution to an excess of ammonium hydrate, or, by adding the hydrate, in excess, to the mercuric-chloride solution; in either case, the precipitate gotten is washed with a limited quantity of water containing ammonium hydrate. By prolonged washing, or by boiling with water, this compound is decomposed into hydrated dimercurammonium chloride and ammonium chloride. $2\,NH_2HgCl + H_2O = NHg_2Cl.H_2O + NH_4Cl$.

Mercurdiammonium chloride $(NH_3Cl)_2Hg$, or "fusible white precipitate," is derived from two molecules of ammonium chloride by the replacement of two hydrogen atoms, one from each molecule, by one atom of dyad mercury. It is formed by the addition of mercuric chloride solution to a boiling solution of ammonium chloride, containing ammonium hydrate until the precipitate first formed ceases to redissolve; on cooling, the salt of the above formula crystallizes. This is a method not likely to be followed by the manufacturing chemist in making ammoniated mercury, on account of the waste of ammonium salts and the loss of the mercury compound, which is soluble in ammonium chloride. Another method is the precipitation of a solution containing equal

parts of mercuric and ammonium chlorides, by addition of sodium-carbonate. Nothing is stated regarding the action of water upon this compound.

Dimercurammonium chloride hydrated, $NHg_2Cl.H_2O$ is theoretically gotten by the introduction of two dyad mercury atoms in place of four hydrogen atoms in a single molecule of ammonium chloride. It is described as a yellowish or a yellow granular compound, convertible into a white powder by a solution of ammonium chloride, and is obtained by boiling the mercurammonium chloride with a large excess of water. If this is boiled with potassium hydrate, it is converted into dimercurammonium hydroxide while potassium chloride is formed: $NHg_2Cl+KOH=NHg_2OH+KCl$.

With a view of studying more especially the first two compounds as to the best methods of commercial preparation, the action of heat upon them as applied to the precipitation from cold and boiling solutions, if possible, to devise a test by which they could be easily distinguished, and lastly, a ready method of analysis, a series of experiments were made.

A number of specimens were made, and these, after analysis, can be divided into four classes:

I. Formula NH_2HgCl.

II. Mixtures of NH_2HgCl and $(NH_3Cl)_2Hg$.

III. Formula $NHg_2Cl.H_2O$.

IV. Formula NHg_2Cl.

All of the specimens under I. and II. were washed, after placing them in small percolators, with 2 portions of dilute ammonia water (1–20) of 20 cc. each: after draining they were pressed between sheets of filter-paper to remove excessive moisture, and dried in an oven at a temperature between 30° and 40°C.

Specimens under III. and IV. being decomposition products, were simply washed with water and dried as above.

I. *a* Made by the U. S. P. process.

I. *b* By boiling for thirty minutes, after adding the ammonium hydrate in excess to solution of mercuric chloride.

II. As the compounds NH_2HgCl and $(NH_3Cl)_2Hg$ differ by one molecule of ammonium chloride, it was considered possible to form the latter by precipitating mercuric-chloride solution, in presence of excess of ammonium chloride, by ammonium hydrate.

The filtrate obtained in the preparation of the specimens under II.

contained more mercury than those under I., due to the solvent power of ammonium chloride upon the compounds formed.

II. *a.* The above supposition carried out in the cold with a solution containing 2 parts mercuric chloride to 1 part ammonium chloride.

II. *b.* The same at the boiling temperature.

II. *c.* Is the product gotten by the action of sodium carbonate, in slight excess, on equal parts of mercuric and ammonium chlorides, no heat being applied.

II. *d.* The above at the boiling temperature.

II. *e.* Boiling the above for thirty minutes.

III. Represent the decomposition products of I, which have the formula NH_2HgCl, by boiling with large quantities of water. If boiled with water after washing they give very pale, yellowish-white precipitates, having the composition $NHg_2Cl.\ H_2O$; boiled with water containing ammonium chloride, as is the case if not previously washed, I. may be converted entirely or in part into the anhydrous compound NHg_2Cl.

III. *a.* Decomposition product of I. *a.*

III. *b.* Same, but I. *a.* washed for a week with cold water without thorough decomposition, finally boiled with water.

IV. Are decomposition products of II. While experimenting with these it was noticed that if the mixture containing the precipitate was boiled for a time, the liquid decanted and the precipitate then boiled with several portions of water, a deep yellow powder was obtained; while if the mixture was placed aside until cold, filtered, the precipitate washed and then boiled with water, a lighter colored powder was obtained. This was attributed to the presence of ammonium chloride which possibly changed the mercurammonium chloride, yielding a whitish decomposition product, into mercurdiammonium chloride yielding a deep yellow decomposition product. To prove this a portion of I. *a* was taken and boiled for a few minutes with a little ammonium chloride; on subsequent decomposition the product was of a distinct yellow color, showing that at least a portion had been changed. The deep yellow colored compound is the anhydrous dimercurammonium chloride, and can also be made from the hydrated by heating to 100° C.

IV. *a.* Product of II. *a*, with washing before decomposition.

IV. *b.* " " II. *a*, without " " "

IV. *c.* " " II. *d*, " " " "

The tests applied to the above preparations were:

1. *Color.* I. and II. were white; III. white with tinge of yellow; IV. yellow.

2. *Fusibility.* Of the specimens made only those in class II. were fusible; of these, *c*, *d* and *e* were more fusible than *a* and *b*, which were only partially so. It has been stated that owing to the decomposition of infusible white precipitate by washing with water, the U. S. Pharmacopœia did not require thorough washing and that if the ammonium chloride remaining in the product equalled 7 to 8 per cent. the mixture would become partially or wholly fusible. The presence of this quantity of ammonium chloride would be sufficient to form 40 to 50 per cent. fusible precipitate from the infusible. The amount of ammonium chloride formed in the U. S. Pharmacopœia process is somewhat less than 2 parts, and as there are over 200 parts of liquid (water) present it should be possible to remove at least three-fourths of this without washing. By washing, at least one-half of the remaining liquid should be displaced, and, without allowing for the additional quantity removed by pressing between bibulous paper, there is left only one-eighth of the original quantity of ammonium chloride, which is 0.25 of 1 part, or, expressed in percentage to the yield of white precipitate, 2.6 per cent. By careful washing and drying between filter paper it should be possible to bring this to less than 1 per cent., which is not sufficient to show any signs of fusion.

3. *Solubility in hydrochloric acid.* Common to all, slowly in the cold, easily on application of heat.

4. *Action of potassium hydrate.* This caused the evolution of ammonia from I. and II., and a yellow color in I., II. and III. No odor of ammonia was perceptible with III. and IV., and litmus paper failed to indicate more than traces; these compounds do not decompose into ammonia, mercuric oxide and potassium chloride, as is the case with I. and II., but are changed into the hydrate corresponding to the chloride, or dimercurammonium hydrate, the chlorine uniting with the potassium to form potassium chloride. In Attfield's Chemistry is the statement that NH_2HgCl on washing was changed into a compound of mercurammonium chloride and mercuric oxide NH_2HgCl,HgO; on examination this is seen to be equal to NHg_2Cl,H_2O, but I doubt its correctness, as mercurammonium chloride will liberate ammonia on addition

of KOH, while the compound resulting from its decomposition will not.

5. *Action of boiling water.* This reacts only with I. and II., and is explained under IV. If a pure NH_2HgCl is boiled with water a whitish product is obtained, while if the NH_2HgCl is contaminated with either mercurdiammonium chloride or ammonium chloride, a pale or deeper yellow is obtained, depending upon the quantity present.

6. *Action of potassium iodide.* I. and II. changed at once to a yellow or red color, III. to a purple, IV. slowly to a brown. On heating they finally took a purple color, while ammonia was freely given off.

7. *Action of sodium thiosulphate.* Were all slowly soluble in a cold solution and, on boiling, deposited black mercuric sulphide. Ammonia vapors were evolved.

8. *Action of ammonium chloride.* The samples were soluble in a boiling solution of the above, III. and IV. first becoming pure white precipitates, showing the change of the dimercurammonium chloride into either the fusible or infusible white precipitates; the former is more apt to be the one, for the ammonium chloride was in excess. This change takes place simply by the addition of one or three molecules of ammonium chloride.

$$NHg_2Cl + NH_4Cl = 2\,NH_2HgCl.$$
$$NHg_2Cl + 3\,NH_4Cl = 2\,(NH_3Cl)_2Hg.$$

9. *Action of acetic acid.* On reading over the tests of the U. S. P. one is apt to receive the impression that the officinal ammoniated mercury is easily soluble in the above acid, but such is not so. All of the specimens examined were but sparingly soluble, I. and II. dissolved upon moderate warming in a considerable quantity of acid; but if this solution is boiled a very peculiar reaction occurs, the mixture becomes turbid, and there is precipitated from the boiling solution a white granular powder. This, after filtration and washing, was found to turn dark on boiling with hydrochloric acid, caused by separation of metallic mercury, and the acid solution, after filtering, showed the presence of mercuric chloride; tested by the addition of ammonium and potassium hydrates the white powder turned black. These tests prove the nature of the precipitate; it is mercurous chloride, or calomel. The filtrate from the calomel contained a trace of mercurous salt, as a turbidity was occasioned by the addition of hydrochloric

acid; the addition of ammonium hydrate after the separation of the mercurous trace, caused only a faint turbidity, but potassium iodide yielded a copious precipitate, showing the presence of mercuric salt in the acetic acid solution, and the solubility of ammoniated mercury in ammonium acetate solution. III. and IV. did not dissolve in the acid, but after boiling for a few minutes and filtering, the filtrate with KI indicated the presence of mercuric salt. The insoluble portion was yellow, and on addition of hydrochloric acid the greater part dissolved, leaving a small quantity of a white powder which, on addition of potassium and ammonium hydrates, blackened, the tests for calomel. Mercuric chloride boiled with acetic acid for a few minutes becomes turbid, and a precipitation of calomel occurs, and for this reason the mercurammonium chloride acts in the same way.

The analysis of the specimens was first attempted by boiling with KOH, which was supposed to liberate ammonia; this could be estimated volumetrically, the residue weighed as mercuric oxide, while the filtrate contained the chlorine which could be precipitated by silver nitrate after acidification with nitric acid. III. and IV. failed to yield ammonia by heating with potassium hydrate, and as nitrogen could be detected by other reagents, as potassium iodide and sodium thiosulphate liberating ammonia, this scheme was supplanted by the following one, even more simple:

1 gm. of the sample is mixed with 20 c.c. water and 1 c.c. hydrochloric acid, hydrogen sulphide is then passed through the mixture until this smells strongly of the gas, after slight warming and allowing to stand for half an hour. This part can be expressed by the reactions:

1. $NH_2\,Hg\,Cl + H_2S = NH_4\,Cl + HgS.$
2. $(NH_3\,Cl)_2\,Hg + H_2S = 2\,NH_4\,Cl + HgS.$
3. $NHg_2\,Cl + 2\,H_2S = NH_4Cl + 2\,HgS.$

The sulphide of mercury is transferred to a weighed filter, the filtrate collected in a tared beaker and after evaporation on a water-bath, both filtrate and filter are dried at 100° C, and weighed.

The percentages of Hg, HgS and $NH_4\,Cl$ obtainable from the different compounds follow:

	NH_2HgCl	$(NH_3Cl)_2Hg$	NHg_2ClH_2O	NHg_2Cl
Hg	79.53	65.61	85.56	88.99
Hgs	92.27	76.09	99.27	103.25
NH_4Cl	21.26	35.07	11.44	11.90

The analyses of the specimens may be tabulated as follows:

	HgS.	NH_4Cl	
I a.	92.20	21.20	} NH_2HgCl.
b.	92.05	21.60	
			26.02% NH_2HgCl.
II a.	80.30	31.50	73.98% $(NH_3Cl)_2$ Hg.
b.	83.80	29.20	} 47.65% NH_2HgCl.
c.	83.80	29.00	} 52.45% $(NH_3Cl)_2$ Hg.
			19.84% NH_2HgCl.
d.	79.30	32.00	80.16% $(NH_3Cl)_2$ Hg.
			48.88% NH_2HgCl.
e.	84.00	——	51.12% $(NH_3Cl)_2$ Hg.
III a.	99.40	——	} NHg_2ClH_2O.
b.	99.60	11.00	
IV a.	100.30	12.00	} Mixtures of NHg_2ClH_2O and NHg_2Cl.
b.	102.20	12.20	
c.	102.40	——	

The results of the experiments may be summed up as follows: Mercurammonium chloride is produced by the addition of ammonium hydrate in excess to a solution of mercuric chloride, as well as by the U. S. P. process. If the ammonium hydrate be added to a boiling solution of mercuric chloride, the above compound will separate as a granular quickly subsiding powder, easier washed than the U. S. P. product. Mercurdiammonium chloride is not gotten pure by the method asserted to yield it, that is by the precipitation of the solution containing the chlorides of mercury and ammonium with sodium carbonate. What is gotten is either a mixture of mercurammonium with mercurdiammonium chloride, or else a double salt of mercurammonium chloride and ammonium chloride, of varying composition The product nearest approaching in composition that of mercurdiammonium chloride was gotten by using a boiling solution of the chlorides, and adding the sodium carbonate, allowing to stand until effervescence ceased, and filtering and washing.

Supposing these products to be a mixture of NH_2HgCl and $(NH_3Cl)_2$ Hg, the percentage of the former can be gotten by subtracting from the percentage of mercuric sulphide, yielded by the sample, 76.09, and dividing the remainder by 0.1618.

Tests to show presence of mercurdiammonium chloride or ammo-

nium chloride in mercurammonium chloride are, firstly, fusibility, which will detect larger quantities, and secondly, the decomposition product by boiling the specimen with large quantities of water, one part precipitate to one hundred parts, repeated twice. If the specimen be pure, only the faintest shade of yellow should tinge the precipitate.

An analysis which undoubtedly is the best method of determining either of the above compounds, is best carried out as given in the analysis of samples. The amount of mercuric sulphide obtained should equal 92.27 % of the sample taken, a smaller percentage proving admixture.

AN EXAMINATION OF CASCARA SAGRADA.

By H. F. Meier and J. LeRoy Webber.

In addition to what has been already ascertained in regard to the chemical composition of the bark of Rhamnus purshiana, we desire to contribute the following: A summary or existing knowledge as to its constitution may be found in The American Journal of Pharmacy for 1879, p. 165, by Prof. Prescott. Passing over the microscopical examination, it appears that there have been recognized among its constituents three resins—a brown, red and yellow resin, respectively; 4, a crystallizable body; 5, tannic acid; 6, oxalic acid; 7, malic acid; 8, a fat oil; 9, a volatile oil; 10, wax; 11, starch.

In addition to what has been above enumerated, we may refer to a note in the *Pharmaceutical Journal and Transactions*, 1885, p. 615, wherein Mr. Limousin expressed the opinion that the resinous bodies, separated by Prof. Prescott, were all more or less derived from chrysophanic acid, which he has observed to be present in it in notable quantities.

In the same journal, 1886, p. 918, there is a reference to a substance, received by Prof. Wenzell, with an examination thesis. It is described as of a deep orange-red color, a glucoside, differing entirely from frangulin and emodin. This description is somewhat fuller than the one given in the American Journal of Pharmacy for 1886, p. 252. In the latter journal it is stated that the principle will be further examined by Prof. Wenzell.

We have found after an exhaustive examination, and abundantly verified the presence of, three other bodies whose influence, both in a pharmaceutical and physiological sense, is of decided importance. We would name here, 1st, a ferment; 2d, glucose; 3d, traces of ammonia.

The ferment alluded to, seems to be identical with that existing in numerous other vegetable substances. While the isolation and ultimate analysis of this element must of necessity be deferred for some time, owing to the difficulty of obtaining it in a state of purity, yet we may say, unhesitatingly, that its effects are identical with those of the principle existing in cabbage, licorice root, in frangula and, undoubtedly, in many other vegetables. Its presence in frangula does not seem to have been suspected hitherto, nor has its range of possibly mischievous action been fully appreciated. That this ferment, as it exists in cascara, is capable of producing griping or epigastric pain, we have absolutely demonstrated. The necessary steps have also been taken to obtain a supply of fresh frangula bark, in order to decide the question absolutely, as we are convinced that it is this ferment in the fresh bark which causes the undesirable results. The process appears to us very simple. If the undestroyed ferment be administered along with the laxative ingredients, as would be the case in a cold infusion, the identical results follow as in the bark itself, that is, a generation of free acid, which in the case of the stomach would undoubtedly be lactic acid, and prove an unwelcome visitor when produced in abnormal quantities. In substantiation of this view, we beg to quote Bartholow (*Materia Medica and Therapeutics*, p. 69): "In large doses (1 drachm) it (lactic acid) gives rise to epigastric pain, flatulence and loss of appetite." How important a recognition of this fact is to the scientific physician will be readily appreciated, inasmuch as a great deal of unnecessary pain and suffering may be prevented. Its importance in a pharmaceutical sense will be recognized by those interested when we state that we have demonstrated that the ferment in question is operative, as far as we are concerned, from the moment that the bark is removed from the tree. It will follow, therefore, that a continuous decomposition and change is going on in this bark, as well as in frangula. The means of removing the difficulty, and of obtaining a permanent bark which retains all of the medicinal activity in the highest degree will be at once apparent, thereby enabling us to secure from decomposition the principle next to be considered, and render the bark absolutely permanent. A few references may not be amiss, in order to indicate how near at hand a recognition of this substance should have been. Quoting from the AMERICAN JOURNAL OF PHARMACY, 1871, p. 457, H. C. Baildon, of Edinburgh, states that "I have repeatedly taken the decoction myself without griping," and

from the tenor of his communication we should conclude that he had been using recent bark. In the same journal, 1876, p. 319, there is an account of a very anomalous behaviour of the fresh bark, and the statement is also made by Fristedt that the recent bark produces colic and vomiting. We have already indicated the cause of the difficulty, and believe that we shall shortly be able to explain why the fresh bark is inefficient, as here noted, in addition to producing the disagreeable effects.

The existence of this ferment may be easily demonstrated to the satisfaction of even the most skeptical investigator in a very simple manner. A cold aqueous percolate from four ounces of the bark of Rhamnus purshiana, to the pint, is divided into two equal portions, and both exactly neutralized with sodium bicarbonate. One portion is now to be boiled or exposed in a flask to the heat of boiling water for at least a half-hour. That a temperature must be used, capable of destroying this ferment, is evident, when the object in view is considered. The addition of a little yeast, to both the infusion and cooled decoction, will illustrate the matter admirably. In the decoction the vinous fermentation alone progresses, while in the infusion a gradual departure from neutrality will be observed, and with increasing acidity a precipitation of the resins, previously held in solution as sodium compounds.

The glucoside referred to seems to be peculiar to Rhamnus purshiana, as we have been unable to determine its presence in the frangula bark, as it occurs in commerce. This glucoside, though having very important functions and properties, has hitherto escaped a deserved recognition. A further examination of the fresh bark will, we think, confirm the existence of a remarkable difference between these two barks, inasmuch as experience has demonstrated that Rhamnus purshiana exerts a decided and unmistakable tonic effect, we are inclined to ascribe these properties to the bitter, crystallizable principle already spoken of. Physiological tests to determine the actual properties, not only of the bitter substance, but of the comparative laxative power of the different resins, are under way. The glucoside may be obtained in a comparatively pure state for examination by precipitating an aqueous infusion or percolate from cascara with sub-acetate of lead. After removal of the excess of lead by H_2S, the solution exhibits a remarkable decomposition, when boiled with sulphuric, hydrochloric, or lactic acid. The solution becomes intensely bitter, turbid on cooling,

and a microscopical examination indicates the presence of a substance, insoluble in water, of an oily or resinous behaviour, and also crystals of the bitter substance referred to. This oily, or resinous body, seems to be an excellent solvent for the bitter principle, inasmuch as on cooling, fine crystals may be seen distributed through it. It is evident from the behaviour of this solution that the ferment has been separated, and it is, therefore, precipitable by sub-acetate of lead.

We do not wish to be understood as supposing or claiming that this ferment acts directly in producing a decomposition of the glucoside, because such is not the case. The ferment simply is instrumental in generating vegetable acids, and these latter are the direct agents engaged in the decomposition. A great step in advance will have been made also, by the recognition of the fact that these changes can take place in the cold, at ordinary temperatures, in the human stomach, in the percolator, and even in the air-dried bark itself, the latter to all appearances being in a decidedly quiescent condition. We must not forget that all the conditions are present, even to the extent of the necessary moisture.

An ultimate analysis of the glucoside as well as the bitter principle will follow shortly.

The glucose, which is present in varying proportions, according to the age of the bark, plays a very important part in the pharmacy of cascara. As a medicinal agent it is certainly inert in common with vegetable albumen, the starches, etc., and is even capable of producing much mischief by undergoing the process of fermentation under favorable conditions. That the glucose is the active element in producing the very undesirable "falling," as referred to by Mr. Butterfield, in the *Pharmaceutical Journal and Transactions*, 1887, p. 473, is very evident; that an extract containing a liberal quantity of glucose may, in the process of manufacture into a pill, gather on its surface a small army of ferment germs with the natural result, will not be denied. The glucose decomposes into alcohol and carbonic acid, and it is not a matter of wonder that the pills get soft. It may be possible to destroy these germs by the application of an alcoholic varnish, but we would respectfully submit our opinion that it would be a much more scientific method to remove the inert glucose and avoid the presentation of bullets.

The traces of ammonia which we have been able to find remaining in the bark, indicate to us that this ingredient has undoubtedly a distinct function, which appears to us as that of rendering the resins solu-

ble and transportable for the purposes of the plant. In this respect we think it very analogous to licorice root, inasmuch as careful observers have already noted the absence from old licorice root of the sufficient amount of ammonia, to render the glycyrrhizin, or sweet principle entirely soluble in water, and have even advised replacing it by exposing the root to the vapors of ammonia in a suitable closed vessel. We beg to refer in this connection to the statements of Dr. Hager, in his "Handbuch der Pharmaceutischen Praxis," p. 664, Supplement, quoting Prof. Landerer on this subject. While ammonia may be the active agent, or base in the plant itself, and which we propose to determine by an examination of the fresh bark, we are convinced that for pharmaceutical purposes other alkaline bases are preferable. It is difficult to concentrate by evaporation a neutral, ammoniacal extract from either licorice or cascara without loss of a decided quantity of the volatile alkali, inasmuch as the organic acids seem to have but a feeble affinity for it, insufficient to resist the dissociating action of the temperature employed in evaporation. Like results would undoubtedly follow an attempted concentration of some other salts of ammonia with organic acids, as for instance, the endeavor to reduce volatile liniment to a solid form.

A full report will follow of the result of experiments directed at the solution of a number of questions of importance; among these questions is one addressed to the immediate source of the acid produced by the action of the ferment, whether it be glucose, albumen, or amyloids, alone or together. Another matter we have undertaken to determine is the part played by the ferment, its mode of action, and the reason for its final exhaustion. This involves a determination of what becomes of it while engaged in its occupation.

We believe also to have a right to expect that some light will be thrown on the formation of the resins themselves in the plant, and that an important natural process may thus be understood. The very existence of glucose itself in the bark is to us an evidence of a preceding glucosic fermentation. That this is continually going on in the apparently inactive bark, we have already shown. The mode of action of the bark of cascara, and which we have carefully studied, leads us to assume that the laxative properties are inherent in the resins, while the tonic effects are undoubtedly due to the crystalline bitter principle. That the bark is both laxative and tonic, and decidedly so, does not admit of further question, in spite of frequent denials.

It is very evident that an analysis of any plant which attempts to give the exact proportions of all its constituents, such as the percentage of its various ingredients, cannot be accepted as authoritative or as indicating the composition of any other specimen of such plant, except the one directly under consideration. It appears to us more important to establish the average quantity of medicinally active ingredients from the best representative specimens of vegetable drugs obtainable, because such a knowledge admits of a practical application to the establishment of a standard and for purposes of assay, so that uniform pharmaceutical products may be obtained. From what we have already demonstrated, it will be seen that an assay of the bark, obtained in a fresh condition, cannot tally exactly in its results with one arrived at from a sample of aged bark, in which decomposition processes have been going on since its removal from the plant.

DETROIT, Laboratory of Parke Davis & Co.

FLUID EXTRACT OF CASCARA SAGRADA.

EDITOR AMERICAN JOURNAL OF PHARMACY:

SIR:—After having tried all published formulas for the extract of cascara sagrada that came under my observation, and finding them deficient in preservative properties, that is, the extracts all precipitated heavily after a few weeks, I endeavored to find a more suitable menstruum for the drug, and believe I have succeeded. With this note you will find a specimen of the fluid extract remaining clear after six months' standing, and prepared by the following process:

Drug in No. 60 powder	1 lb.
Alcohol	1½ pts.
Water	½ pt.

Moisten and pack in percolator; macerate for forty-eight hours, collect the first 13 fluid-ounces, evaporate the remainder to 3 ounces, and mix with the reserved portion.

Among the many readers of the Journal some may have had the same trouble with cascara, which may be avoided by using the above menstruum.

GERMANTOWN, Philadelphia, Jan. 23, 1888. Yours, etc.,

WM. BICHY.

ANALYSIS OF RICINUS COMMUNIS.

By Addison Lloyd Beck, Ph.G.

From an Inaugural Essay.

This plant is a native of India, and in tropical countries attains a height of forty feet; in warm temperate regions it is a woody branching bush, twelve to fifteen feet high, and in this climate it is an annual herb of variable sizes, according to the care and cultivation, and protection of the young plants in early spring time. When grown in its native climes it seeds well for six years, then ceases to bear and dies off. It is successfully cultivated in different parts of the world, chiefly for the oil found in the seeds, but other uses are made of the different parts of the plant. The records note that it was introduced into Italy and the United States about the same time, in the year 1855,[1] and continues to be largely cultivated in this country, especially in Illinois and other western States. In 1867 experiments were tried in California with success; the plants grew luxuriantly, and gave a large yield of seeds, but the expense of gathering the crop was so great that its continued cultivation did not assume commercial importance.

The uses of the castor-oil plant are numerous. The oil expressed from the seeds, aside from its demulcent and purgative properties as a medicine, is largely used as a lubricant for machinery and as a dressing for preserving and softening leather; also in dyeing and printing. It is largely used in India as a lamp oil, giving an excellent white light with but little soot.

The oil cake is used as a manure, and in India for making illuminating gas.[2] The leaves of the plant form the food of the silk spinning bombyx (see American Journal of Pharmacy, 1855, p. 110), and are used medicinally as a galactagogue (*Ibid.*, 1851, p. 176), and in India also, for the cure of rheumatism by warming or sweating them, and binding on the parts affected. According to Mr. Rafford (*Ibid.*, 1883, p. 422), flies disappear from a room in which castor-oil plants have been placed; and it has been recently suggested that the dried and powdered leaves be used as an insect powder. The objec-

[1] According to a paper by Prof. Procter, published in American Journal of Pharmacy, 1885, p. 99, the crop of ricinus seeds in Illinois and Missouri, in 1850, was 250,000 bushels, and yielded 350,000 gallons of oil.—Editor.

[2] It has also been recommended for the destruction of insects, and the cultivation of the plant in saffron beds is said to protect the latter against mice. See American Journal of Pharmacy, 1875, p. 233.—Editor.

tions to this use, however, would be the dark color of the powder and the disagreeable odor of the plant.

The dried plant, including the roots, is used for fuel (*Ibid.*, 1867, p. 59), and the natives of upper India find an excellent use for the wood as a building material for thatching their homesteads of mud walls, its chief recommendation being its immunity from attack of white ants and other insects. The wood makes an excellent paper pulp. Bees infest the castor plant when in flower, and an abundant supply of honey may be obtained from a castor plantation.

PROXIMATE QUANTITATIVE ANALYSIS.

The analysis of the plant was made in the new chemical laboratory of the Philadelphia College of Pharmacy.

The root, stem and leaves were each reduced to No. 80 powder, and treated by the method proposed by Dragendorff, except that the powder was thoroughly exhausted by successive portions of the different solvents, as well as other modifications suggested by Prof. Trimble.

Leaves.—Five grams of the powder on drying at 110° C. to constant weight, showed moisture 12·7 per cent., and the same portion ignited left 11·22 per cent. of ash, of which 5·62 per cent. was soluble in water; 4·81 per cent. soluble in HCl, and 0·79 per cent. insoluble in both liquids. A qualitative examination showed the presence of potassium, calcium, magnesium, and traces of iron and manganese, with carbonic, phosphoric and sulphuric acids.

Fifty grams of the powder were extracted with petroleum spirit which, on evaporation, left a dark, semi-fluid residue of disagreeable odor, amounting to 4·58 per cent, which on heating to 120° C. lost 0·254 per cent., was deprived of smell, and was considered volatile oil which was verified by distillation from another portion of the drug, separating the oil from the distillate by agitating with petroleum spirit, and allowing the latter to evaporate, when a small portion of the oil remained, having the disagreeable odor of the freshly bruised leaves.

The following are the chief characteristics of the petroleum extract: Semi-fluid and does not solidify at 0° C.; dark-green in color; specific gravity. about .9089; permanent grease spot on paper; partly soluble in H_2SO_4 and glacial acetic acid, and slightly in HNO_3; chloroform, ether, benzol and carbon disulphide dissolve it completely, and alcohol 2·57 per cent.

On treating a portion with a strong solution of NaOH, no evidence of saponification was obtained.

In the effort to purify this extract it was found that by treating a portion with an alcoholic solution of sodium hydrate, adding an equal volume of water and agitating with petroleum spirit, and evaporation of the same, an orange-red wax, soft and liquid at 27° C., was obtained. The alkaline residual liquid was then acidified and again agitated with petroleum spirit, which on evaporation left a dark residue that melted at about 87° C., which proved to be a resin similar to that obtained in the ether extraction.

A portion of the purified wax was treated according to the scheme proposed by E. Hirschsohn for the identification of waxes (AMERICAN JOURNAL OF PHARMACY, 1880, p. 303). The solution on cooling remained clear, and an alcoholic solution of ferric chloride neither gave a precipitate nor colored the solution, showing that it differed from the waxes mentioned by him. Its light specific gravity would distinguish it also, as well as its low fusing point.

The powder was then extracted by stronger ether, and a portion evaporated, showing residue amounting to 2·575 per cent., which melted at 91° to 93° C. It was entirely soluble in chloroform, benzol and carbon bisulphide. Absolute alcohol dissolved 2·02 per cent. of resin. When tested for alkaloids and glucosides negative results were obtained.

The tincture obtained by exhausting the powder with absolute alcohol was reduced by distillation at a low temperature by means of a vacuum, to 200 c.c. Two portions of 20 c.c. each, were evaporated to dryness and 3·12 per cent. of extract obtained, which on ignition left 0·15 per cent. of inorganic matter. The extract was soluble in water to the extent of 2·58 per cent. The remaining 160 c.c. was evaporated to dryness, and redissolved in water, filtered, and made up to 160 c.c. and divided into eight portions of 20 c.c. One portion, precipitated with ammoniacal zinc acetate, washed, dried and ignited, indicated 1·008 per cent. of tannin. Another portion treated by solution of neutral lead acetate, gave the same results. Other portions were found to contain small amounts of glucose and saccharose. One portion was made slightly acid and agitated successively with petroleum spirit, benzol, and chloroform, then made alkaline and treated in the same way as before, with the solvents named. Chloroform was the only one that dissolved anything. The residue, dissolved in alcohol and allowed to evaporate slowly, deposited crystals, which were

washed of adhering coloring matter with ether in which they were almost insoluble.

To obtain more of the crystals, a quantity of the drug was extracted with alcohol, the solution evaporated, and the crystalline principle separated from the wax and resin by acidulated water, and agitation with chloroform as before, and purified by repeated solution in hot alcohol and precipitation by ether. The crystals were soluble in water, alcohol and chloroform; gave no reaction when treated with Mayer's reagent and other alkaloidal precipitants, excepting the tri-iodide of potassium. They melt at 194° C.; have a bitter taste, and are colored green with H_2SO_4 and $K_2Cr_2O_7$. In testing for glucosides the results were negative. When heated with caustic soda a decided reaction for ammonia was obtained, thus showing the presence of nitrogen. The crystals responded to the tests for ricinin, so named by Prof. Tuson, who found it in the seed and considered it an alkaloid (AMERICAN JOURNAL OF PHARMACY, 1864, p. 423); it was also found in the leaves by Prof. E. S. Wayne, who states that it has no claims to be called an alkaloid. (AMERICAN JOURNAL OF PHARMACY, 1874, p. 97).

With a view of determining its ultimate composition, three combustions were made for the estimation of the carbon and hydrogen, and two with soda-lime for nitrogen, estimating oxygen by difference. The results would indicate ricinine to be an alkaloid, having the formula $C_{24}H_{32}N_7O_3$:

RICININE.	FOUND.		CALCULATED $C_{24}H_{32}N_7O_3$.
	FIRST.	SECOND.	
Carbon	62·00	62·03	61·81
Hydrogen	6·87	7.55	6·87
Nitrogen	21·00	21·00	21·02
Oxygen	10·13	9·42	10·30
	100·	100·	100·

Distilled water extracted from the powder 18·479 per cent., which, on ignition, left an ash amounting to 5·78 per cent. A portion mixed with two volumes of alcohol and allowed to stand twenty-four hours, precipitated mucilage and albumin amounting to 4·915 per cent. The filtrate evaporated to a syrup and mixed with four

volumes of alcohol precipitated dextrin and other carbohydrates 5·10 per cent., estimated by boiling with dilute acid, and treating with Fehling's solution. Glucose and saccharose were determined in the filtrate by dividing in two portions, the one treated directly with Fehling's solution, and the other after inversion by diluted acid, and ignition of the cuprous oxide obtained. The glucose found amounted to 1·99 per cent. and the saccharose 0·39 per cent., by difference.

The residual powder insoluble in water was treated with a 0·2 per cent. solution of caustic soda. On evaporating and drying a part of the extract the residue was found to be 2·47 per cent. which, on ignition, left 1·27 per cent. of inorganic matter. After acidifying a portion and adding 3 volumes of alcohol, the albuminous matter precipitated, amounting to 0·95 per cent.

The residue washed free from alkali, was treated with a 1 per cent. solution of HCl, which extracted 3·55 per cent., which on incineration left 1·36 per cent.; showing by difference organic compounds amounting to 2·193 per cent.

The residue, washed and dried, amounted to 49·03 per cent. The ash was determined in a few grams of the residue, amounting to 0·87 per cent. After treatment with chlorine the cellulose was washed, dried and weighed; the loss by chlorine was 5·44 per cent., leaving 43·59 per cent. of cellulose.

Stem.—The stem reduced to powder, on drying at 120° C. indicated moisture 6·1 per cent., and the same portion ignited, ash 5·46 per cent. The petroleum spirit extract was 0·275 per cent., consisting of wax with a little resin, the same as found in the leaves. Ether extracted 0·316 per cent. resin identical with that found in the leaves. Alcohol dissolved 0·83 per cent., which crystallized on spontaneous evaporation, and proved to be ricinine with a little coloring matter.

Root.—The root dried, then ignited, showed moisture 7·08 per cent., and ash 7.05 per cent. Petroleum spirit extracted 0.38 per cent. of wax similar to that found in the stem and leaves, except that the melting point is 40° C., and that it is less soluble in alcohol. Ether dissolved 0·338 per cent. of resinous and coloring matter. Alcohol separated 0·416 per cent., the extract containing crystals of ricinine, thus showing that this principle, as well as the wax, exists in all parts of the plant.

The further examination of the root and stem, more than the results given, could not be completed for want of time.

RECAPITULATION OF PROXIMATE ANALYSIS.

	LEAVES.	STEM.	ROOT.
Extracted by petroleum spirit	4·582	0·275	0·380
" " ether	2·575	0·316	0·338
" " alcohol	2·490	0·833	
" " water	12·699		
" " diluted NaOH	1·200		
" " " HCl	2·193		
Loss by chlorine	5·440		
Residues, cellulose, etc.	43·590		
Ash	11·220	5·466	7·050
Moisture	12·700	6·100	7.083
Loss	1·311		
	100·		

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the AMERICAN JOURNAL OF PHARMACY.

PREPARATION OF A DEXTRIN TO REPLACE GUM ARABIC.—The registry of the following process, by Schuhmann, was announced on November 3d, 1887: The milk of starch is treated with one one-hundredth part of its weight in starch, of hydrochloric, nitric or sulphuric acid. In twenty-four hours the mixture is washed until the waters give no acid reaction. The starch paste thus prepared is diluted to a thick pap, and heated in a digester to 160°–170° C.; or it may be treated in a closed vessel under ordinary pressure, with a current of super-heated air or vapor, until the product ceases to color with iodine. The soluble product thus obtained is diluted to 20°–25° Beaumé, and —a little albumin being added—is heated to the boiling point and passed into a Taylor apparatus, or into a press-filter, in which it is clarified and made colorless with bone-black. Thus purified it is evaporated to a proper consistence, or may be reduced to dryness. A small quantity of vegetable gum may be added with advantage. The mass obtained by this process is entirely soluble in warm or cold water; it is odorless and tasteless, and greatly resembles gum arabic, both in its aspect and its properties; and it may replace gum arabic in most of its uses.—*Moniteur Scientifique*, p. 41, January, 1888.

PEPTONE AND SYNTONIN BY CHEMICAL REACTION.—According to Mr. A. Clermont (*Comptes rend.; Arch. de Phar.*, January 5, 1888), peptones may be made to have a nutritive as well as a digestive value. To make simply nutritive peptones he mixes 20 gm. of hashed meat with 30 gm. of water, and 50 cgm. of sulphuric acid in a glass tube, which he seals and heats in an oil-bath at 180° C. After cooling the tube is opened, and the gaseous products go off, leaving a light-brown liquid, which being filtered and dried (when it gives off ammoniacal vapors), is dissolved easily in water, and again filtered. The solution thus obtained is not precipitated by boiling, or by hydrochloric, nitric or acetic acids; a sufficient quantity of alcohol throws it down, however, as also tannin, bichloride of mercury and chloride of platinum. The product was 4 gm. of peptone for 20 gm. of fresh meat. Repeating the experiment without sulphuric acid, syntonin was obtained; the solution filters slowly, and gives an abundant precipitate with nitric acid. In slightly acidulated water, syntonin easily passes—under the influence of pepsin—into a peptone. Clermont thinks that syntonin would be of great value in cases of slow digestion.

"SELS DE MORUE."—M. Langlebert, a Parsian pharmacist, has been making researches upon the probable therapeutic value of baths composed of salt, which has been previously used in fishing-vessels for the temporary preservation of cod-fish. He finds in this salt (by analysis), a considerable amount of azotized material in the forms of methylamine, dimethylamine and trimethylamine, substances which have, according to the author, been used successfully in affections such as chlorosis, anæmia, scrofulosis, rachitis, infantile paralysis, osseous affections, rheumatism, etc. He concludes, therefore, that the presence of these substances in cod-fish salt, united to the therapeutic value of the salt itself, offers a compound worthy of the consideration of therapeutists.—*Jour. de Phar. et de Chim.*, January 1, 1888.

ACTION OF ACIDS AND ACID SALTS UPON SYR. AURANT. AMAR.—Leprince, a Bourges pharmacist, points out that however carefully the syrup may be made, it always contains a certain amount of mucilage which is liable to cause the solidification of a preparation with many commonly prescribed medicaments, especially the phosphates. He recommends that the syrup be made wholly from the alcoholic extract. It will then, though retaining all of its taste and aroma, re-

main wholly unaffected by the action of acids.—*Monde Pharm.*, December 20, 1887.

SACCHARIN.—P. Vigier has announced to the French Society of Pharmacy his use of saccharin to advantage in an *elixir dentrifice* made up with a large quantity of oil of mint. He also uses saccharin to sweeten pastilles of chlorate of potassium.—*Arch. de Phar.*, January 5, 1888.

PRESERVATION OF SALICYLATE OF SODIUM.—This salt, whether crystallized or in powder, loses its acid reaction and makes brown solutions after being exposed to the light for a month or six weeks; it may also become musty, and in paper it turns grayish and becomes inert. So it should be kept from moisture and the light. It should also be said that its preservation in liquid form is much affected by the quality of the water used in making the solution; it may turn brown in a few hours in ordinary water, though in distilled water no change is observable.—*Pharm. Cent.; Jour. de Phar. et de Chim.*, January 1, 1888.

CRYSTALLIZED ACONITINE AND DIGITALIN.—The toxic power of these chemicals is so great that several members of the Paris Society of Pharmacy propose that the maximum dose of the former—in granules—should be limited to $\frac{1}{4}$, and of the digitalin to $\frac{1}{10}$ mgm. Bourgoin cited a case in which $\frac{1}{4}$ mgm. caused dangerous symptoms; and another in which $\frac{1}{2}$ mgm. caused the death of the patient.—*Soc. de Phar.*, Paris, December 7, 1887.

AMORPHOUS AND CRYSTALLIZED STROPHANTHIN.—At the *Société de Thérap.*, November 23, 1887, M. Catillon showed samples of this substance which he said was "soluble in 3 times its weight of warm absolute alcohol, and in 30 times its weight of water; $\frac{1}{2}$ mgm. in hypodermic injection, killed rabbits weighing 750 gm." M. Dujardin-Beaumetz has used strophanthus in three cardiac cases; he gave daily 10 drops of a 50 per cent. tincture of the seeds, and increased the dose by two drops per diem to 15 or 16 drops a day. He uses also a tincture, of which 5 drops represent a mgm. of the extract. He said that strophanthus had a slower but longer continued action upon the heart than digitalis; it is much more suitable in cases where the heart enters into the "tired condition," than when systolism is definitely declared. Diuresis by strophanthus is less abundant, but longer continued than that from digitalis. Catillon stated that $\frac{1}{10}$ mgm. of strophanthin is equal to 1 mgm. of the extract, or 5 drops of the tinc-

ture of strophanthus. M. Blondel stated that fraud was already used in selling strophanthus, as among the seeds he found some whose strength had been already extracted with alcohol.—*Le Prog. Méd.*, December 17, 1887.

ASSAY OF COLCHICUM SEED.—To determine the amount of colchicine, Mr. A. Kremel exhausts with alcohol, in a displacement apparatus, 20 gm. of the unbruised seeds. After boiling for two hours, the alcoholic liquor is poured into an evaporating dish, with the alcohol used in washing the receiver, and 25 ccm. of water. The residuum after evaporation—10 to 15 ccm.—is filtered and exhausted with chloroform, which takes up the colchicine. It is again dissolved in chloroform, which is finally evaporated in a water-bath. The chloroformic extract is treated with water to disassociate the combination $C^{22}H^{25}NO^6+2CHCl^3$ which has formed; and is then evaporated to dryness.—*Jour. de Phar. et de Chim.*, January 1, 1888.

STACHYS BULBIFERA.—The *Arch. de Phar.*, December 5, 1887, describes this "new vegetable" of Japanese origin, which Mr. Paillieux has been cultivating on his little farm near Paris. It is a tuber formed of successive nodes, and is from 3 to 5 centimetres in length; the tubers are the rhizomes produced by the plant, which attains to a height of 25 to 40 centimetres. It grows very rapidly and requires little care; its rhizome has the color and consistence of salsify, and its taste resembles that of the artichoke. It may be stewed or fried, and can be eaten with vinegar, like a salad. It may become popular. The editor of the *Jour. de Phar.* refers to it as "this precious vegetable."

THE CHEMISTRY OF SLEEP as shown in the difference between the respiratory combustion of natural slumber and that which is produced artificially, was considered in a paper presented by M. de Saint-Martin. He observed that independently of the fasting condition, natural sleep lowered by 50 per cent. the amount of carbonic acid exhaled, and by 10 per cent. the amount of oxygen absorbed. During sleep induced by morphine the proportion of carbonic acid exhaled fell to a half, and during that produced by chloral or chloroform to a third of the quantity exhaled during the same time in natural sleep. During chloroformic anæsthesia—sufficiently prolonged—the blood became impoverished in oxygen, and was charged with an increased amount ofcarbonic acid.—*Le Prog. Méd.*, December 17, 1887.

GLEANINGS FROM THE GERMAN JOURNALS.

By John A. Martin, Ph.G.

Phthalate of morphine.—E. Bombelon recommends phthalate of morphine as the morphine salt that best fulfils the requirements of the physician. It is more soluble in water than the morphine salts of the mineral acids, and the solutions keep for a long time, even when very dilute. One part is soluble in five parts of water. The solutions are perfectly neutral, and do not produce pain when used for hypodermic injections.

To obtain a pure salt an absolutely pure phthalic acid must be used as there is no mother-water, and the compound does not crystallize, but is obtained as an air-dry varnish, or in the form of beautiful transparent scales.

Hydrochlorate of morphine is precipitated with ammonia, washed and pressed, the alkaloid morphine dissolved in acetic acid, and again precipitated with ammonia, washed and pressed; the purified morphine thus obtained is added in small quantities at a time, to a hot solution of phthalic acid as long as it is dissolved, taking care to add a slight excess of morphine. When the solution has cooled, filter and evaporate with the aid of a gentle heat to the consistence of syrup; pour upon heated glass plates to dry and scale.—*Phar. Zeitung*, 1887, p. 488.

Solution of indigo for writing ink.—Inks are often entirely spoiled by adding a solution of indigo in sulphuric acid. An indigo solution prepared as follows, can be mixed with any ink without injuring it: powdered indigo, 4 parts; sulphuric acid (Nordhausen), 16 parts; macerate for 48 hours with occasional shaking, and add: powdered iron, 7 parts; pyroligneous acid, 5 parts; distilled water, 160 parts.

Cinchona hair tonic.—Oil of rosemary, oil of lemon, each 1 part; tannin, tincture of cantharides, each 2 parts; balsam of Peru, 5 parts; glycerin, rose water, each, 20 parts; tincture of cinchona, and cologne water, of each 120 parts.

Superior cologne.—Oil of ylang-ylang, 1 part; oil of mignonette, oil of jasmin, and oil of lemon, of each, 2 parts; cherry-laurel water, and tinctnre of vanilla, each, 3 parts; triple orange-flower water, 100 parts; alcohol, 1000 parts. The mixture should be warmed by placing the container in hot water; then let it stand in a cool place for a few days and filter. Warming the mixture partly replaces distillation. —M. Fischer in *Pharm. Ztschr. f. Russland*, 1887, p. 468.

Emulsion of lanolin.—As this emulsion is not easy to prepare Hoefle's method, given in *Ztschr. d. Öst. Ap. Ver.*, is worthy of notice: Lanolin is heated to completely expel the water it contains; it is then weighed and rubbed up with half its weight of powdered gum arabic, the quantity of water required for oil emulsions added, and the emulsion prepared in the usual manner.—*Pharm. Ztschr. f. Russland*, 1887, p. 510.

Antiseptic petrolatum.—Brondel, in *Med. Ztg.*, recommends for use on the hands of accoucheurs a mixture composed of corrosive sublimate and oil of eucalyptus, each, 10 parts; soft paraffin, 100 parts.—*Rundschau, Prag*, 1887, p. 752.

Binoxide of hydrogen as a styptic.—According to Neudorfer, *Med. Zeitung*, 1887, 15, a single drop pressed upon the wound for one minute is sufficient to stop the bleeding.—*Archiv der Pharmacie*, 1887, p. 588.

Canadol is recommended as a reliable and economical anæsthetic to take the place of ether and cocaine. It is a colorless, very volatile and inflammable liquid, obtained as a by-product in the distillation of American petroleum; in odor resembles benzin, and is not miscible with water or alcohol in any proportion. During its use the skin becomes very hard and completely insensible. Operations are easily conducted, and in cases of bleeding the blood may be chilled at once.—*Rundschau, Prag*, 1887, p. 729. (See AMERICAN JOURNAL OF PHARMACY, 1887, p. 490).

To prevent bumping in retorts during distillation.—Reissmann, in *Ph. Centralh.* recommends the use of a tightly wound spiral of platinum wire, loosely filled with long pieces of pumice-stone, the ends of the spiral so turned in that the pieces of pumice-stone can freely move about without falling out. The weight of the spiral must be heavy enough to sink in the liquid. For very large retorts several of these spirals must be used.—*Rundschau, Prag*, 1887, p. 818.

Improved insect powder.—A mixture of 1 part naphthalin, and 100 parts powdered pyrethrum roseum is more effectual than the pyrethrum flowers alone. The naphthalin must be in very fine powder.—*Med. Chir. Centralblatt; Phar. Ztschr. f. Russland*, 1887, p. 558.

THE DRUG BUSINESS IN AUSTRALIA, INDIA AND THE UNITED STATES.[1]

Read before the Alumni Association, Philadelphia College of Pharmacy.

In a comparison of the pharmacy of America (U. S.), Australia and India, we have three countries widely separated and each dependent on its situation and customs in the developement of its drug trade, and uninfluenced by any other country, with the exception probably of Australia, which naturally patterns after England, her people being thoroughly English as far as the profession of chemistry is concerned, though outside of this, they more nearly resemble Americans in their business enterprise. America by her early independence and hostility to England, her admixture of pharmacists from all countries, is distinctly responsible for the progress made in the profession in this country, the best evidence of which is in the revised edition of the British Pharmacopœia which inclines to that of the United States in formulas as well as classification. India necessarily uses the British Pharmacopœia, her druggists being of that nationality as well as ninety-nine onehundreths of her white population. But the condition under which business is done in India, the customs of the country and the climate, necessitate a different state of affairs in many cases.

The most important item is, of course, proficiency, and which of the three countries can claim the palm? The United States has Colleges of Pharmacy in several cities, and her Examining Boards in some States to regulate the trade and restrict it to competent persons; and Australia is likewise provided, while many of her druggists serve their time and obtain their certificate in England. In India a majority of the druggists are members of the British Pharmaceutical Society, and it is not to be gainsaid that the examination is very rigid, and many rejections are made both in the minor and major years. But India has no pharmaceutical laws and allows anyone to engage in the drug business; hence there are many incompetent persons so engaged, who depend wholly on their clerks in the conduct of their business. We have such here, but the number is small, fortunately, and legislation will shortly prevent it entirely.

The apprentice in the United States, serves on an average three years, while the Australian is required to pay a premium and serve five years. There is no apprenticeship in India worth speaking of, owing to the conditions which govern society. Does a five years apprenticeship turn out a better man than that of three years? I think not, except in one case, and that is the slow-plodding fellow who is slow to learn, means to learn, and once he has mastered a subject retains it. But the average apprentice is as competent at the end of three years to do the practical work of a drug store as the five-year lad, and at the end of his fourth year is infinitely superior to the latter, owing to the greater scope of work he attends to, while the apprentice still lingers at defined limits. The Australian certainly has no advantage in his longer apprenticeship. After the apprenticeship or during its latter years, the theoretical branch of pharmacy impresses itself on the student and owing to our superior advantages in collegiate education and more stringent registry laws, the home druggist excels his Australian cousin on the average. There has been but one pharmaceutical school in Australia for many years and the attendance but slight,

1 See also AMERICAN JOURNAL OF PHARMACY, 1887, p. 103.

while the qualification examination has been merely nominal, except in Victoria where they were more strict. The Colonial Boards have now united and a General Board for Australia has been organized, looking to a more rigid regulation of pharmacy. But *practice* is what counts in pharmacy, and undoubtedly we are a nation of practical people. In our drug stores the clerk who is neat in his work, alert in his attention to customers, suave in his dealings, with them, and quick and accurate in his work, is the most appreciated. The nature of our trade forces these ideas on him, and he is very dull who does not see that these attributes are the essence of three-fourths of his future success in his profession. On the other hand the Australian is more slow-going, given to "taking his time," and has not that freedom of conversation with customers incident to Americans. The English idea of "master and man" is very prevalent in Australia, few of the employers vouchsafing a friendly or social word to their clerks, but maintaining an air of "upper crust," which seems to suppress one somewhat. He lacks the tact and address of his cousin, and does not learn that expertness and celerity in manipulation incident to the American, as his employer insists on his customer giving time, which is generally double that really necessary. In India the average druggist is good, but the Australian is better, and from my experience and connection with employers and clerks, the American is the best "all 'round" druggist of the three; and an American clerk who has faith in his own qualifications, can take a position in any of the two countries and feel that although "a stranger in a strange land," he is there "to stay."

There is but little room for comparison in the appearance and arrangement of the stores, for we are far ahead in making our places of business attractive. Australia and India stick to the old gold paper label, but few stores have improved on their shelf bottle, and the antediluvian carboy still occupies half the show window. Paper labels on the drawers, ancient designed show cases, and a general air of "don't come in unless you want physic," give them anything but an attractive appearance. I speak of the average store, for there are some that are superior to these, but very few. The stock differs in some respects. We often carry lines of goods not belonging to a legitimate drug business, and our sundries goods branch is greatly enlarged. The Australian does a more legitimite drug business, his sundries being confined mostly to toilet requisites, etc. In India the drug store is generally a department of a general merchant's establishment, consequently wholly pharmaceutical, the druggist attending only to this department. The handsome soda fountains customary in our stores find no place in Australian establishments, nor in India, but in the latter place the business of bottling aerated waters is connected with and a part of the drug business. Did the climate permit people to walk the streets of Indian cities during the summer as we do here, the fountains would hold high carnival there, but only those venture about in the sun who are compelled to do so; hence there are but few white people about during the hours when the fountain is expected to appeal to their patronage. One might say, "But there is a large evening trade for soda-water by pedestrians." Granted; but in India the stores all stand back from the streets in lots, and the pedestrians at night are few in number, the stores being closed at dusk, one clerk remaining about the premises in case of a call. The usual apartment for patents is customary to all and the trade is similar in each country, except that there are more American patents on the Australian and Indian shelves,

than vice versa. The cigar case usually found at the entrance of our drug stores is also absent in the other countries, the Australian druggist not selling the weed, and the Indian druggist selling them by the box only. There is small reason to do otherwise in India, when cigars sell at thirty-five cents to $1.00 a hundred.

There is considerable difference in prescription work, India and Australia being somewhat similar. Blanks are not furnished physicians as in this country, the doctor providing these himself, and they are as a rule about three times the size of our ordinary blank, and why they should be so I have never been able to determine. If it were the custom as with us, to retain the original prescription, the file would present a very ragged sight, so many sizes of paper being used; but in Australia and India, the prescription belongs to the patient and must be returned. This entails much more work in dispensing than with us, but the facility in referring to old prescriptions is far preferable than raking through a dusty file. A good plan when time will admit, is to daily copy the prescriptions and renew entirely from the book. The form of label is similar to ours, except that in all cases the physician adopts the very commendable practice of writing the name of the patient. This name is put on the label and the doctor's name omitted. It is a most important item in dispensing and it would be a great improvement if our M.D.'s would practice it. In Australia, Latin directions are the rule, while in India they are in English, certainly the proper way, and it seems absurd that a system that allows the patient to retain the prescription, should not also adopt English directions, which would be a guide and check on the dispensor. Mixtures are of larger quantities than ours, the average being six and eight ounces, but the doses are in proportion, and a favorite practice is to direct the doses in parts, for instance, one-sixth part, one-fourth or one-eighth part, every two hours, etc. This necessitates a graduated paper being pasted on the bottle. I prefer our own method. Empty capsules are not used, but capsuled pills as prepared in America are used to a great extent. Many coat their pills with French chalk, but they are not desirable.

The Australians and Indians have much to learn yet in coating pills for the market, their best being very inferior to ours. Few spread plasters are used, another point wherein they are in the rear. The manner of printing "The Mixture," "The Liniment," etc., on prescription labels, is customary in all stores in the two countries mentioned, and I believe it is a step backward for us to be giving up the idea, for such seems to be the case. The old labels were not suitable to the advance in the designing of the present labels, but a very pretty label, with the names as above, can be printed, which looks very neat on a bottle, and may often prevent mistakes. It may surprise some when I say that in prescription work the most complete I have seen done, is that in the drug stores of India. Bottles of all descriptions are kept in stock, flint and blue glass, from the smallest up to quarts. Blue bottles are always used for external remedies, and the corks capped with red sealing wax; mixtures, etc., with black wax. All labels are "The Mixture," "The Ointment," etc.; then there are the slips—"Caution," "Poison," etc., and each bottle is capped with a Hunt's bottle cap; 'Poison" caps for that sort. A bottle is never refilled when brought in for that purpose, but a clean bottle always used, no matter whether for mixture or liniment. The slightest soil on a pill box or powder box label

is reason for a new box. Distilled water is always used unless specified otherwise, and many druggists make a practice of silver-coating all pills prescribed, unless otherwise ordered. Every bottle of drugs sold is capped, and no parcel is sent out unless wrapped in a second paper enclosing the label. Prices seem to rule the same in the three countries. The penmanship of prescriptions cause the same trouble the world over; some good, some bad, and some that Webster has no words to describe. But for pure "cussedness" and unintelligible scrawl the "cake" must be awarded to a physician I met in Tasmania. This man was a member of the English College of Surgeons, a well educated man and a fine physician, but with a handwriting that gave one neuralgia to look at. He never used any blanks, but always selected the dirtiest piece of paper he could find, and never wrote on two pieces of the same shape, but, from the looks of the prescriptions, took peculiar delight in making as many shapes as possible. He started off with something that was meant for a name, but looked as if his pen had run riot. He then spread himself over the paper, brought his directions up in a line to see how the "riot" was getting along, and then lost them in a new prescription he was writing from another corner. Half a dozen prescriptions on the same paper, and no two written in the same direction. This would have made little difference had they been legible, but one had to do some tall guessing to read them. We always had a "picnic" at the store about once in three months. He took quarterly trips to the tin mines, and while there prescribed for patients who came to him. He took a big sheet of white paper, and on this sheet went the prescriptions, each one written as the paper happened to be lying when the patient came in. Each had a name, but all looked the same; each had directions, but it was seldom with the prescription. When he had a sheet filled he would post it down with instructions to dispense and send to the parties mentioned. The whole force of the establishment then went to work and solved the puzzle as best we could.

There is a better cash business conducted in this country, than in Australia. Credit business in Australia is very general, and the majority of accounts run yearly. In India nine-tenths of the business is credit, but accounts are collected monthly. There is a great loss, though, and as the statute of limitations is only three years there are many opportunities for swindling one out of a bill. Salaries of clerks are better here than in Australia. A first-class clerk in Australia can seldom get over $18.00 a week, while the majority are paid about $10 to $12.00. In India salaries increase with time of service, and a good man can, at the end of five or six years, be drawing $200.00 a month and over. The hours of business in Australia are similar to ours, while in India they are, during the day, only with one in calling distance after dark.

I have endeavored to point out, as far as possible, the points of difference between the respective countries mentioned, and summing up my reflections on the subject, I cannot but think that we have surpassed the two countries in all that pertains to Pharmacy and that we are now able to hold our own with any of the countries of Europe. May the good work go on, and may we come to that state when to be a druggist means that every such man has won his way to that position by an apprenticeship, a College Diploma, and a moral character that gives him a high position in the community in which he resides

JOHN A. FALCK.

Los Angeles, Cal., December 26th, 1887.

VARIETIES.

Physiological action of oil of turpentine.—Dr. Hare gives the following summary of his observations:

1. Oil of turpentine in small doses, resembling those ordinarily given in practical medicine, produces an increase in the number of the cardiac beats due to a direct stimulant action on the heart.

2. In larger doses it produces distinct slowing of the pulse, due to a stimulation of the pneumogastric or inhibitory centre.

3. Its influence on the vaso-motor system, if at all, is very slight, either with large or small doses.

4. Poisonous doses (5 c.c. to 10 c.c.) (ℿ. 80 to 160) produce death by cardiac failure when injected directly into the jugular vein.

5. The drug in small doses increases reflex action somewhat, but in large doses decreases it, the increase being due to a stimulation of the spinal cord, and the decrease due to depression of the sensory side of the cord and afferent nerves.—*Medical News*, November 19, 1887.

Effects of salicylic acid on the health.—The question whether the continuous use of salicylic acid is injurious was attacked by Kolbe, who took for nine months at least fifteen grains of salicylic acid daily in his drink without the least symptom of injury. Dr. Lehmann (*Arch. f. Hygiene*, V.) has further experimented on two Munich laborers, one of whom, aged forty-nine, for ninety-one days, excepting Sundays and holidays, *i. e.* for seventy-five days, took altogether in his beer five hundred and seventy-eight grains. The other, aged thirty-seven, consumed in the same time over seven hundred grains. Neither of these suffered in the least. Now this amount is immensely in excess of what could possibly have been put in the exported beer alleged to have contained salicylic acid. It should be further said that the best brewers repudiate both the allegation of using salicylic acid and the necessity of using it.—*Med. Chronicle*, October 6, 1887.

Pyridine in asthma.—In the course of former experiments Renzi observed that, besides lessening the number of respirations, pyridine also increased the energy of the heart's systole. He therefore tested it in severe cases of heart disease. He first gave the pyridine in doses of from six to ten drops, diluted with two or three drachms of water, and gradually increased the dose to twenty-five drops. In the cases of nephritis and mitral stenosis there was no improvement, but in the others there was a strengthening of the systolic impulse, and the number of beats was lessened. The blood-pressure was increased. A systolic action was allayed more readily by pyridine than by digitalis, and it has no cumulative effects. Angina pectoris, that often complicates such cases, was more benefited by pyridine than by anything else.—*Centralbl. f. klin. Med.; Jour. Am. Med. Assoc.*, Dec. 10, 1887.

Ether as a parasiticide.—The killing of pediculi pubis by one single application of ether, has first been suggested by Dr. G. P. Thomas, of Alameda, in California. Ether recommends itself in preference to chloroform, which has been employed for the same purpose, as causing less pain and irritation to the skin of this very tender region.—*London Medical Record.*

Coca extract in painful affections of the stomach.—In the last two years and a half D'Ardenne has treated many cases of painful affections of the stomach with coca extract, for the purpose of relieving the pain. In the cases associated with

structural lesions of the stomach-walls the relief was of short duration and incomplete, but in the purely functional cases the pain was always caused to disappear, however severe the attack, and though the usual remedies had been employed in vain. The dose used was two grains of the extract, every two hours.—*Rev. Gen. de Clin. et de Ther.; Jour. Amer. Med. Assoc'n*, Dec. 10, 1887.

MINUTES OF THE PHARMACEUTICAL MEETING.

The meeting was called to order and Mr. Wm. B. Thompson was asked to preside.

The minutes of the last meeting having been read, Mr. McIntyre alluded to the fact that no mention was made of a statement regarding the poor quality of *sugar* supplied to the trade; the registrar stated that the matter had been frequently up before the meeting and the grades of sugar which were unobjectionable had been repeatedly mentioned. Mr. Robbins said that the statement about the possibility of exhausting *buchu* was directly different to what he intended to say; that while three-fourths of the percolate would contain the activity of the buchu it would require quite double that quantity of liquid to moisten and expel the liquid percolate to exhaustion.

Mr. Lemberger, of Lebanon, made a few remarks about the growth of the College and the wide-spread influence its graduates had upon the pharmacy of our country.

The registrar presented to the library from Dr. Ruschenberger, U. S. N., a copy of the History of the College of Physicians, for the first hundred years of its existence, for which the meeting returned the thanks of the College.

A sample of *cold-pressed linseed oil* was received from Dr. A. W. Miller. Another sample made by Aschenbach & Miller from seed ground out West showed the presence of copper; but the sample presented which was made from seed ground by the firm, has none of the appearances indicating copper.

The query propounded was whether cold-pressed linseed oil was in any wise different from the commercial oil. Mr. Moerk said that much of the commercial oil was purified by treatment with acids, and if it has been so treated it is not amenable to the same tests as an oil obtained by percolating pure meal with a solvent and evaporating the latter; the test of its solubility in an equal volume of absolute alcohol is a reliable test, and the test with 95 per cent. alcohol is also an interesting one. Mr. Procter moved, as Mr. Moerk had so tho roughly examined the subject, that the committee be discharged from further consideration of the matter; this was seconded and the motion was carried.

Mr. Franz, a member of the senior class, read a paper upon *Eupatorium perfoliatum*. A paper upon *mercurammonium chlorides* was read by Mr. F. X. Moerk. The paper was listened to with close attention and elicited remarks from several present. Prof. Remington referred to the compound which had been described as thrown down in a granular powder, and said that it was very important that the article should be entirely free from grit and should easily mix into a smooth ointment as it is employed frequently in granular eyelids.

Mr. J. H. Bunting read a paper detailing experiments made in the pharmaceutical laboratory under the direction of Prof. Remington, upon the most suitable menstruum for a *fluid extract of blue cohosh*.

A paper upon *syrup and fluid extract of lactucarium* by Mr. Geo. M. Beringer was read by the registrar. Mr. Webb inquired whether benzin did not remove some of the valuable principles of the lactucarium; Mr. Lemberger said that he thought it did not and that he had been repeatedly assured that the remedy was a valuable one. Mr. Webb said that some years ago Mr. Hubbell sold a syrup of lactucarium which was as handsome almost as Aubergier's, but that it was dosed with morphine to give it efficiency. The question as to what kind of lactucarium was to be preferred, most of those present expressed a preference for the English article. Mr. England had used Allen's in preference to any other and gave a formula for the syrup published in the December number of the Journal for 1886.

Professor Remington said that he noted the recommendation in reference to *fluid extracts* of fifty per cent. strength; that it would be an act of retrogression; that the late Professor Procter was the author of the class of extracts as they are now prepared, and that to introduce fluid extracts of half strength would be an admission of the inability of the pharmacist to make as good an article as our present formulæ directed; that fluid extracts represented progress, the outcome of the studies on percolation by Dr. Squibb and other eminent operators in pharmacy.

Mr. McIntyre said he thought Prof. Remington's remarks did not cover the whole ground, the difficulty is for the apothecary to obtain pure drugs; that the wholesale manufacturer had the first chance and did not have to rely upon ground drugs, and that as some physicians are now furnishing the medicines to their patients we have no chance to improve the fluid extract or syrup of lactucarium.

Mr. England read a paper upon *emulsion of terebene*, and Mr. F. B. Quackenbush, a member of the junior class, read a paper upon *fluid extract of yerba santa*, giving the results of experiments made in the pharmaceutical laboratory of the College. All the papers read were referred to the Publication Committee. After a short discussion a motion to adjourn was made and carried.

T. S. WIEGAND,
Registrar.

EDITORIAL DEPARTMENT.

Death of Professor Asa Gray.—This eminent botanist died at Cambridge, Mass., January 30th, in the seventy-eighth year of his age. A biographical sketch will appear in our next number.

Joseph Roberts, President of the American College of Pharmacy, and during 1885–86, President of the American Pharmaceutical Association, died January 31st, after an illness of one week, from pneumonia; aged sixty-three years.

The Texas and Southwestern Druggist, published at Waco, Texas, will be unable to issue its February number, owing to the destruction by fire of the printing office during the latter part of January. We trust that our contemporary will soon be enabled to resume publication.

Crowded out.—A number of books and pamphlets have accumulated upon our table during the past two months, editorial notices of the same in the pages of the Journal having been delayed through other matters claiming space; but we hope to make room for these reviews in the March number.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Year-Book of Pharmacy, comprising abstracts of papers relating to Pharmacy, Materia Medica and Chemistry, contributed to British and foreign journals, from July 1, 1886, to June 30, 1887; with the Transactions of the British Pharmaceutical Conference at the twenty-fourth annual meeting, held at Manchester, August, 1887. London: J. & A. Churchill, 1887. 8vo, pp. 631.

Proceedings of the American Pharmaceutical Association at the thirty-fifth annual meeting held at Cincinnati, O., September, 1887; also the Constitution, By-Laws and Roll of Members. Philadelphia: Published by the American Pharmaceutical Association, 1887. 8vo, pp. XX and 729.

These two annual publications have both been issued in January. They contain the full minutes of the annual meeting of the Association publishing the book, including the papers read, reports of officers and committees, etc. Among the latter is the "unofficial formulary" accepted by the Conference, and comprising formulas for thirty-seven pharmaceutical preparations not contained in the British Pharmacopœia. The formulary prepared by a Committee of the American Association is by far more extensive as might be expected, considering the large territory, the most urgent wants of which it is intended to supply. It was intended to be printed in the present volume of Proceedings, which, however, would have considerably delayed the distribution of the latter; hence the Council authorized, for the present, the omission of the "Formulary" which will be furnished to the members as soon as completed.

The minutes and papers, a full synopsis of which has been given in the October number of this Journal, occupy in each of the volumes nearly two hundred pages, the number of papers read before the Conference exceeding by five those read at Cincinnati; and respectively, 317 and 371 pages are occupied by the Year-book and the Report on the Progress of Pharmacy, the former being supplemented by a list of books and pamphlets on pharmacy and collateral branches published during the preceding year.

Both volumes, like their predecessors, are of permanent value to the pharmacist and druggist as books of reference to the pharmaceutical literature during the preceding year.

Organic Analysis. A manual of the descriptive and analytical chemistry of certain carbon compounds in common use. For the qualitative and quantitative analysis of organic materials; commercial and pharmaceutical assays; the estimation of impurities under authorized standards; forensic examination of poisons; and elementary organic analysis. By Albert B. Prescott, Ph.D., M.D., Director of the Chemical Laboratory in the University of Michigan, etc. New York: D. Van Nostrand, Publisher, 1887. 8vo, pp. 533.

It appears to us that the aim and character of the work are summarized in the following sentences quoted from the Author's preface: "As a mere changeful body of directions, giving the latest expedients in methods, analy-

tical chemistry cannot claim to have educational value; but as an operative introduction to the character and deportment of compounds, analysis becomes a logical mode of study, fruitful of important results."

Organic analysis rests primarily upon the nature and character of the more important compounds, including their physical and chemical behaviour under the influence of various agents; and the value of analytical methods, both qualitative and quantitative, depends upon the perfection of the processes for the characterization or isolation of the compounds under the most varying conditions. Obviously, as a mode of study, analysis will fulfil its objects best, if character and behaviour of the compounds under consideration be continually kept in view.

The work before us has evidently been written with such objects in view. Not merely one or more processes are given by which a compound may be recognized or distinguished from others; but in each case its chemical constitution, its origin, and its essential physical and chemical characters are given in full, and subsequently the means of identifying the compound are stated, its separation from others, and its quantitative determination, together with the methods for ascertaining its purity, or estimating the amount of impurities present. The literature of each subject is fully given, the original sources being quoted together with the year when first published, and with such other journals or works that are likely to be more accessible than the original publications.

The arrangement is alphabetical; but very similar compounds and the important constituents of a drug or plant are treated together under one common head. Thus butter, castor oil and other fats are mentioned in their alphabetical order, but are considered under "Fats and Oils;" quinine, cinchonine, etc., under "Cinchona Alkaloids;" brucine and strychnine under "Strychnos Alkaloids," etc. In all cases where observations have been made regarding the passage of organic compounds through the animal economy, the results are fully noted and afford a most valuable aid to the investigator in forensic and other researches. The most recent schemes for plant analysis, elementary analysis, the determination of fats, coloring matters, alkaloids and other groups of organic bodies are comprehensively considered under appropriate heads.

The work will prove to be a very valuable one for the laboratory. It is calculated to widen the views of the intelligent student in his endeavors to acquire a substantial knowledge of the carbon compounds; and the experienced analyst will find it a comprehensive and reliable work of reference on most questions which are likely to arise in analytical investigations. Several classes of compounds, like sugars and other carbohydrates, various hydrocarbons and allied bodies, possess considerable commercial and pharmaceutical importance, and would seem to deserve much fuller treatment than could be accorded to them under the head of plant analysis.

The make-up of the book is attractive, the illustrations are instructive, and the arrangement of the matter is convenient for ready reference.